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Research Article

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Evaluation of Physical Activity Level and Cardiovascular Risk in Postmenopausal Women in a Sub-saharan Urban Area

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Abstract

Objectives: We aimed to evaluate the level of physical activity and cardiovascular risk of postmenopausal women in Yaoundé, Cameroon.

Methods: We conducted a cross-sectional study from December 2019 to May 2020. The physical activity of the women was assessed using the International Physical Activity Questionnaire short form and a pedometer. The Framingham risk score was used to investigate the risk of cardiovascular disease. Analysis of variance and Chi-square tests were used to find continuous and categorical independent variables with physical activity level.

Results: A total of 175 postmenopausal women were recruited in the study, with a mean age of 60.6 ± 7.4 years (49 - 79 years) and a mean age of onset of menopause 50.3 ± 3.5 years (40 - 60 years). About half of study participants had moderate to high-intensity physical activity levels assesses by International Physical Activity Questionnaire, and 29.8% were classified as physically active according to pedometer measurements; 50.3% had a low ten years cardiovascular risk. Factors associated with physical inactivity were the absence of professional activity and hypertension. Cardiovascular risk, low-density lipoprotein cholesterol, and total cholesterol decreased significantly with an increased level of physical activity.

Conclusion: Half of the postmenopausal women in Yaoundé have moderate to intense physical activity. Policies to encourage physical activity in this age group should be implemented to reduce their cardiovascular risk and improve life quality.

Keywords: Cardiovascular Risk; Women; Physical Activity; Menopause; Cameroon

Abbreviations

IPAQ: International Physical Activity Questionnaire; FRS: Framingham Risk Score; LDL: Low-Density Lipoprotein; TC: Total Cholesterol; HDL: High-Density Lipoprotein; ANOVA: Analysis of Variance.

Introduction

Cardiovascular diseases are responsible for about 17.9 million deaths per year, representing 31% of global mortality [1]. Most deaths caused by cardiovascular diseases occur in sub-Saharan

Africa due to the poor control of cardiovascular risk factors in these countries [2]. The prevalence of cardiovascular diseases increases with age and is higher in men compared to women. This distribution inverts after menopause in women due to the decrease and loss of estrogens' protective effects [3]. The more important risk factors for cardiovascular diseases include high blood pressure, high cholesterol levels, inadequate intake of fruit and vegetables, overweight and obesity, physical inactivity, and tobacco use. Five of these risk factors are closely related to physical activity and diet [4]. About a third of adults worldwide are physically inactive, with proportions ranging from 17.0% in southeast Asia to about 43% in the Americas and the eastern Mediterranean [5]. Physical activity is essential in the prevention and treatment of cardiovascular diseases. It has various cardiovascular benefits: it improves endothelial function, reduces blood pressure, controls the weight and HDL cholesterol level [6,7].

Estrogens have a protective cardiovascular effect in premenopausal women. The prevalence of cardiovascular diseases in women, therefore, increases after menopause. Physical activity in this group will be particularly beneficial to relieve menopausal symptoms and cardiovascular health [8]. Data on physical activity in sub-Saharan Africa are scarce, and significant disparities exist in physical activity in different parts of the world. This study aimed to evaluate the level of physical activity and cardiovascular risk of women living in an urban area in sub-Saharan Africa.

Methods

Study population and setting

This was a cross-sectional study conducted in Yaoundé, the capital city of Cameroon. Communities were selected by the cluster sampling method. The study was done for six months (December 2019 to May 2020). Postmenopausal women aged below 80 who gave their consent to take part in the study were included.

Data measurement

The women's physical activity was assessed using the International Physical Activity Questionnaire (IPAQ) short form and a pedometer. This questionnaire asks about three specific types of activity: walking, moderate-intensity activities, and vigorous-intensity activities. The minutes spent every week on each activity type are computed separately by multiplying the duration and frequency of activity. The subjects were divided into low, moderate, and high levels of physical activity based on their total physical activity (MET-min/week) and the frequency of the activities [9]. A participant was classified as physically inactive using a pedometer if she had < 6000 footsteps/day [5,10].

Framingham risk score (FRS) was used to investigate the risk of cardiovascular disease. Six coronary risk factors were used, including age, gender, TC, HDL-cholesterol, systolic blood pressure, and smoking habits. Ten-year risk in percentage was calculated by total points (1 point 6%, 2 points 8%, 3 points 10%, 4 points 12%, 5 points 16%, 6 points 20%, 7 points 25%, 10 points or more > 30%). Absolute CVD risk percentage over 10 years was classified as low risk (< 10%), intermediate-risk (10-20%), and high risk (> 20%) [11].

Data analysis

Categorical data were described with numbers and percentages, while continuous variables were reported as mean ± standard deviation for normally distributed data and median [interquartile range] for skewed variables. Associations between categorical variables were calculated using Chi-square tests. The one-way ANOVA test and Kruskal-Wallis H tests were used to compare means or medians respectively between groups. All analysis was performed with SPSS (Version 23, IBM SPSS, Chicago, IL, USA) and significant level was set at 0.05.

Ethical considerations

We are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. We conducted the study following the Declaration of Helsinki and the Harmonized Tripartite Guideline for Good Clinical Practice from the International Conference on Harmonization. This study was reviewed and approved by the Institutional Ethics and Research Committee of the Faculty of Medicine and Biomedical Sciences of the University of Yaoundé I (approval number 024/UY I/FMSB/VDRC/CSD), and informed consent was taken from all the patients.

Results

Description of the study population

A total of 175 postmenopausal women were recruited in the study. The mean age was 60.6 ± 7.4 years (range: 49 - 79 years). The age of onset of menopause was 50.3 ± 3.5 years (range 40 to 60 years). Most of the participants reported having felt hot flashes at least once, and 34.8% reported hypersudation. None of them were on hormone replacement therapy. Two-third were either overweight or obese, and the mean BMI was 29.7 ± 6.3 Kg/m^2 (range: 16.5 - 53.8 Kg/m^2). The mean FRS was 12.1 ± 8.9 (1.3 - 39.2), and half of the participants had a low cardiovascular risk (Table 1).

Variables	Frequency	Percentage
Education level		
None	7	4.4
Primary	78	44.5
Secondary	74	42.5
University	15	8.6
Employment status		
Retired	8	4.6
Self-employed	75	42.9
Civil servant	28	16.0
Unemployed	64	36.6
Tobacco smoking	17	9.7
Hypertension	105	60.0
Diabetes	19	10.9
Dyslipidemia	50	28.6
BMI		
Underweight	3	1.7
Normal	39	22.3
Overweight	52	29.7
Obesity grade 1	51	29.1
Obesity grade 2	18	10.3
Obesity grade 3	12	6.9
FBS>1.26, g/l	38	21.7
HDL<40, mg/dl	20	11.4
TC>200, mg/dl	75	42.9
LDL>130, mg/dl	70	40.0
TG>150, mg/dl	13	7.4
Cardiovascular risk†		
Low	88	50.3
Intermediate	49	28
High	38	21.7

Table 1: General characteristics of the study population. BMI: Body Mass Index; FBS: Fasting Blood Sugar; HDL: High Density Lipoprotein; TC: Total Cholesterol; LDL: Low Density Lipoprotein; TG: Triglycerides. †Cardiovascular risk was assessed with the Framingham risk score. For BMI categories, underweight: BMI < 18.5 Kg/m^2; Normal: BMI = [18.5 - 25[Kg/m^2; Overweight: BMI = [25 - 30[Kg/m^2; Obesity grade 1: BMI = [30 - 35[Kg/m^2; Obesity grade 2: BMI = [35 - 40[Kg/m^2; Obesity grade 3: BMI ≥ 40 Kg/m^2.

Level of physical activity

The mean number of footsteps per day was 4792 ± 3241 (range: 315 - 18226). The prevalence of physical inactivity was 70.2%. Using the IPAQ questionnaire, the prevalence of low, moderate, and high-intensity physical activity was 47.4%, 13.2%, and 39.4%, respectively.

Factors associated with physical activity level

Table 2 shows a pattern between the level of physical activity and various factors. Physical activity intensity tends to decrease with age; the cardiovascular risk score also increases significantly with lower physical activity levels ($p < 0.001$).

Variables	Physical activity level†			p value
	Low intensity N = 83	Moderate intensity N = 23	High intensity N = 69	
Age, years	62.9 ± 7.8	57.5 ± 5.3	58.8 ± 6.8	<0.001
Weight, kg	80.2 ± 17.3	72.2 ± 12.2	78.6 ± 18.4	0.148
BMI, kg/m^2	30.5 ± 7.7	28.0 ± 4.8	29.2 ± 6.3	0.157
FBS, g/ml	1.14 ± 0.36	1.13 ± 0.24	1.11 ± 0.29	0.858
TG, mg/dl	76 [62 - 90]	74 [53 - 102]	72 [53 - 85.5]	0.657
HDL, mg/dl	59.8 ± 19.5	57.7 ± 10.7	57.5 ± 16.3	0.694
LDL, mg/dl	131.3 ± 59.9	129.3 ± 65.8	106.9 ± 45.4	0.022
TC, mg/dl	206.9 ± 57.9	214.8 ± 71.7	179.1 ± 45.8	0.003
Cardiovascular risk ‡	12.5[6.4 - 21.3]	12.9 [9.0 - 22.0]	7.0 [3.9 - 12.4]	<0.001
Secondary or higher education	41(46.1)	15(16.9)	33(37.1)	0.329
Absence of a professional activity	51(55.4)	13(14.1)	28(30.4)	0.034
Hypertension	29(41.4)	5(7.1)	36(51.4)	0.015
Diabetes	12(63.2)	3(15.8)	4(21.1)	0.218

Table 2: Factors associated with physical activity level. BMI: Body Mass Index; FBS: Fasting Blood Sugar; HDL: High Density Lipoprotein; TC: Total Cholesterol; LDL: Low Density Lipoprotein; TG: Triglycerides. †Physical activity level was assessed using the International Physical Activity Questionnaire. ‡Cardiovascular risk was assessed using the Framingham risk score.

Discussion

We aimed to investigate the level of physical activity and postmenopausal women's cardiovascular risk score in an urban area in sub-Saharan Africa. We found that 52.6% of the study participants had moderate to high-intensity physical activity levels assesses by the IPAQ questionnaire, and 29.8% were classified as physically ac-

tive according to pedometer measurements. Half of them had a low 10 years cardiovascular risk according to the Framingham equation. Factors associated with physical inactivity were the absence of professional activity, hypertension, and age ≥ 70. Cardiovascular risk, LDL cholesterol, and total cholesterol decreased significantly with an increased level of physical activity.

The mean age of onset of menopause was 50.3 ± 3.5 years. This value is slightly different from those reported in other sub Saharan countries like Nigeria and Ghana with ages of 47 ± 4.2 and 48 ± 3.6. Menopause also occurs earlier in African women than Caucasians [12,13]. The most frequently reported symptom linked to menopause is hot flashes (86.7%). Studies have shown that African women have very little knowledge of the existence of hormone replacement therapy. Similar results were found by Diouf., *et al.* in Senegal, where 85.9% of women reported having hot flashes and 0.9% recurred to hormone replacement therapy [14].

Evaluation of the level of physical activity showed that 52.6% of the participants had moderate to intense physical activity according to the IPAQ questionnaire; meanwhile, the proportion of physically active women using a pedometer was 29.8%. The observed difference could be explained by the fact that IPAQ tends to overestimate physical activity level. It takes into account physical activity done during house chores, which constitutes a great part of most of our participants' daily routine. Omoyemi., *et al.* in 2016 found 60% moderate to intense physical activity in their cohort of postmenopausal women [12]. Generally, Caucasian women have lower levels of physical activity [5]. In Brasil, Colpani V., *et al*. found 68% of postmenopausal women with low physical activity levels in 2011 [15].

The high percentage of women (49.7) having intermediate to high 10-year cardiovascular risk in this study might be due to urbanization and lifestyle changes in developing countries. In 2015, Ama Moor., *et al.* found a proportion of 60.2% [16]. However, the study was done in a hospital setting, increasing the proportion of women with cardiovascular risk factors.

This study, however, has some limitations, such as the sample size, which could be increased to reflect more closely the reality. The IPAQ questionnaire is a reliable tool to evaluate physical activity level, but it remains subjective; therefore, the results' accuracy might not be optimal.

Conclusion

Half of the Postmenopausal women in Yaoundé have moderate to intense physical activity. High physical activity level is associated with a low 10 years of cardiovascular risk, low blood pressure, low LDL, and total blood cholesterol levels. Policies to encourage physical activity in this age group should be implemented to reduce their cardiovascular risk and improve life quality.

Authors' Contributions

- Conception and design: CNNG, VJAM, CAP, APM
- Collection and assembly of data: CNNG, AAM, VJAM, CAP
- Data analysis and interpretation: CNNG, VJAM, CAP, AAM, GSW, DPTN, GWB
- Writing the manuscript: All authors
- Final approval of manuscript: All authors.

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Declaration of Conflicting Interests

All authors have completed the ICMJE uniform disclosure form. The authors have no conflicts of interest to declare.

Availability of Data and Materials

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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